AD

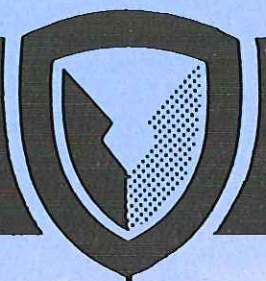
TECHNICAL REPORT
7T-11-FSL

DO PEOPLE EAT IN DINING HALLS AS OFTEN AS THEY SAY THEY DO ?

Approved for public release;
distribution unlimited.

August, 1976

UNITED STATES ARMY
NATICK RESEARCH and DEVELOPMENT COMMAND
NATICK, MASSACHUSETTS 01760



Food Sciences Laboratory

Approved for public release; distribution unlimited.

Citation of trade names in this report does not constitute an official indorsement or approval of the use of such items.

Destroy this report when no longer needed. Do not return it to the originator.

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE *(When Data Entered)*

REPORT DOCUMENTATION PAGE

READ INSTRUCTIONS BEFORE COMPLETING FORM

1. REPORT NUMBER: 7-T-11	2. GOVT ACCESSION NO.
3. RECIPIENT'S CATALOG NUMBER	
4. TITLE *(and Subtitle)*: DO PEOPLE EAT IN DINING HALLS AS OFTEN AS THEY SAY THEY DO?	5. TYPE OF REPORT & PERIOD COVERED
	6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s): James R. Siebold	8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS: Food Sciences Laboratory, US Army Natick Research and Development Command, Natick, MA 01760	10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS: 6.2, 1J662713A034, Task 03
11. CONTROLLING OFFICE NAME AND ADDRESS: US Army Natick Research and Development Command, Natick, MA 01760	12. REPORT DATE: August, 1976
	13. NUMBER OF PAGES: 22
14. MONITORING AGENCY NAME & ADDRESS*(if different from Controlling Office)*	15. SECURITY CLASS. *(of this report)*: UNCLASSIFIED
	15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT *(of this Report)*

Approved for public release; distribution unlimited.

17. DISTRIBUTION STATEMENT *(of the abstract entered in Block 20, if different from Report)*

18. SUPPLEMENTARY NOTES

Service Requirement Identification: USAF 4-6, Menu Combinations for Cash Food Service

19. KEY WORDS *(Continue on reverse side if necessary and identify by block number)*

Attendance
Self-Report Methods
Consumer Acceptance
Feeding Systems

20. ABSTRACT *(Continue on reverse side if necessary and identify by block number)*

The purpose of the study was to assess the validity of self-reported attendance rates at meals in a military dining facility. In a personal interview setting, 171 airmen were asked how often they ate breakfast, lunch, and dinner in the dining facility during a typical 5-day work week and during a typical 2-day weekend. The reported frequencies subsequently were compared to observed rates averaged over two weeks.

DD FORM 1 JAN 73 1473 EDITION OF 1 NOV 65 IS OBSOLETE

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE *(When Data Entered)*

Of the airmen who had eaten at least one meal in the dining facility, 76% overestimated actual attendance. Reported rates significantly exceeded observed rates for each type of meal (breakfast, lunch, and dinner) and for each type of day (weekday and weekend). Reported and actual rates also differed in the conclusions they yielded when comparing attendance rates at different meals. In general, the inaccuracy of self-reports varied among the different types of meals and between the different types of days, although it did not correlate highly with how often the participants ate in the dining hall.

Possible explanations of these findings were discussed, and implications for the self-report method, in general, were considered.

Preface

The reported data was collected as part of a multi-phased project at Shaw Air Force Base, SC, in June-August 1974.

The author would like to express appreciation to Ms. Day Waterman, Dr. Edmund Smutz, and Dr. Howard Moskowitz for their assistance in data collection, and to the Food Service Office of Shaw Air Force Base for its cooperation and support in the project. Gratitude is also expressed to Mr. Leon Klarman, Mr. Peter Priori, and Ms. Nancy Cobean for their work in programming and running the analysis of the collected data.

Table of Contents

List of Tables

List of Figures

Do People Eat In Dining Halls As Often As They Say They Do?

As one of the largest food suppliers in the world, the U.S. Armed Forces have placed increasing emphasis on meeting the expectations of their members for palatable food served in convenient and comfortable surroundings. In the last five years, a number of large-scale survey studies have been undertaken by the various services to assess consumer satisfaction (e.g., Meiselman, Van Horne, Hasenzahl, & Wehrly, 1972;[1] Branch, Symington, & Meiselman, 1973)[2]. Among the variables measured by these instruments, one typically receiving considerable interest has been the reported rate of attendance at meals in the dining facility. The emphasis on this variable is likely related to its additional use as an index of the economic solvency of the food system. Information about attendance rates has been obtained in the surveys through a series of questions asking respondents to report, for a typical week, how often they eat meals in the dining hall.

Since the origination of this method, the question has arisen as to the validity of the reports it elicits; namely, whether reported rates accurately reflect actual attendance behavior. To date, no evidence bearing directly on the issue has been reported. Studies have been done, however, investigating the validity of self-reports with regard to other types of behavior, e.g., grades received in school (Walsh & Murray, 1972)[3], job performance (Williams & Sieler, 1973)[4], academic growth (Pohlman, 1972)[5], and product purchases (Byham & Perloff, 1965)[6]. The correspondence obtained in these investigations between reported and actual behavior varied. Collectively, however, the findings do indicate that, without empirical verification, self-reports may not be accepted as valid indicators of actual behavior. The purpose of the present study was to undertake such a verification for self-reports of attendance frequency at meals in a military dining facility. Specifically, the purposes were to determine: (a) the absolute level of agreement between self-reported and actual attendance; (b) the relative level of agreement between the two measures; and (c) whether agreement was influenced by a variety of independent variables.

---

[1]Meiselman, H.L., Van Horne, W., Hasenzahl, B., & Wehrly, T. The 1971 Fort Lewis food preference survey. U.S. Army Natick Laboratories Technical Report, TR 72-43 PR, 1972.

[2]Branch, L.G., Symington, L.E., & Meiselman, H.L. The consumer's opinions of the food service system: The 1973 Minot Air Force Base survey. U.S. Army Natick Laboratories Technical Report, TR 74-7 PR, 1973.

[3]Walsh, W.B., & Maxey, E.G. Validity of self-report and personality. Journal of Counseling Psychology, 1972, 19, 563-564.

[4]Williams, W.E., & Sieler, D.A. Relationship between measures of effort and job performance. Journal of Applied Psychology, 1973, 57, 49-54.

[5]Pohlman, J.T. A study of the validity of self-reported measures of academic growth. Dissertation Abstracts International, 1973, 33(9-A), 4951-4952.

[6]Byham, J., & Perloff, R. Recall of product purchase and use after six years. Journal of Advertising Research, 1965, September, 16.

Method

As part of a larger project to assess the consumer acceptability of a new dining system at Shaw Air Force Base, SC, attendance records were maintained of all personnel who ate in the dining hall during a 14-day period. This was accomplished by first attempting to distribute a plastic identification card to each member of the base enlisted population (N = 4,399). Seventy per cent of the personnel eventually received a card. During the 14 days of this study, each patron was required to present his card at the end of the service line to an assistant who recorded the man's identification number along with his food choices.

Three weeks following the collection of the actual attendance data, a random sample of 175 personnel was selected for personal interviews. The sample was selected by, first, categorizing card-holders according to the number of meals they ate in the dining hall during the 14 day period (0, 1-4, 5-8, 9-12, and 13 or more) and, then, selecting a random 4% of the members from each category. The sample was composed of 94% males with an average age of 26.1 years.

All participants were questioned individually by one of three male interviewers. One series of questions required them to report the frequency with which they ate breakfast, lunch, and dinner in the dining hall during a typical 5-day work week and during a typical 2-day weekend.

Due to recording and misidentification errors, four interviews were rejected, leaving 171 personnel for whom reported and actual attendance figures were available for each of six types of meals - breakfast, lunch, and dinner on weekdays, as well as on weekends.

Data were also recorded pertaining to patterns of attendance by individuals over time. These data are presented and discussed in an appendix to this report.

Results

Before initiating the main analyses, it seemed desirable to combine the two weeks of actual attendance data to facilitate the comparison with the self-report data, which pertained to one week only. A three-way analysis of variance, with Week (1, 2), Day (weekday, weekend), and Meal (breakfast, lunch, dinner) as the three factors, yielded no significant difference in attendance rates between the two weeks, nor any significant interactions involving the Week factor. Consequently, unweighted means of the meal rates for the two weeks were computed for each of the six types of meals for comparison purposes.

Absolute and Relative Differences Between Reported and Actual Attendance

In general, self-reports overestimated actual attendance. For 99 respondents (58% of the sample), reported attendance, summed over the six

types of meals, exceeded actual attendance. This is in comparison to 26 (15%) who attended more meals than they reported, and 46 (27%) who ate as often as they reported. The last of these figures may be somewhat misleading if it is assumed that the difficulty involved in estimating attendance was substantially less for persons who consistently did not eat meals in the dining hall than for more regular attenders, since 41 of these 46 participants had not attended any meals in the dining hall during the test period.

Further analysis of these data was by means of a three-factor analysis of variance, in which Day, Meal, and Source (report, actual) comprised the three factors. To make the weekday meal rates (both reported and actual) comparable to the weekend rates, they were converted to daily averages by dividing the weekday rates by five and the weekend rates by two. All main and interaction effects, with the exception of the triple interactions were significant (Figure 1). Of particular interest to the present discussion were the two interactions involving the Source variable and their follow-ups.

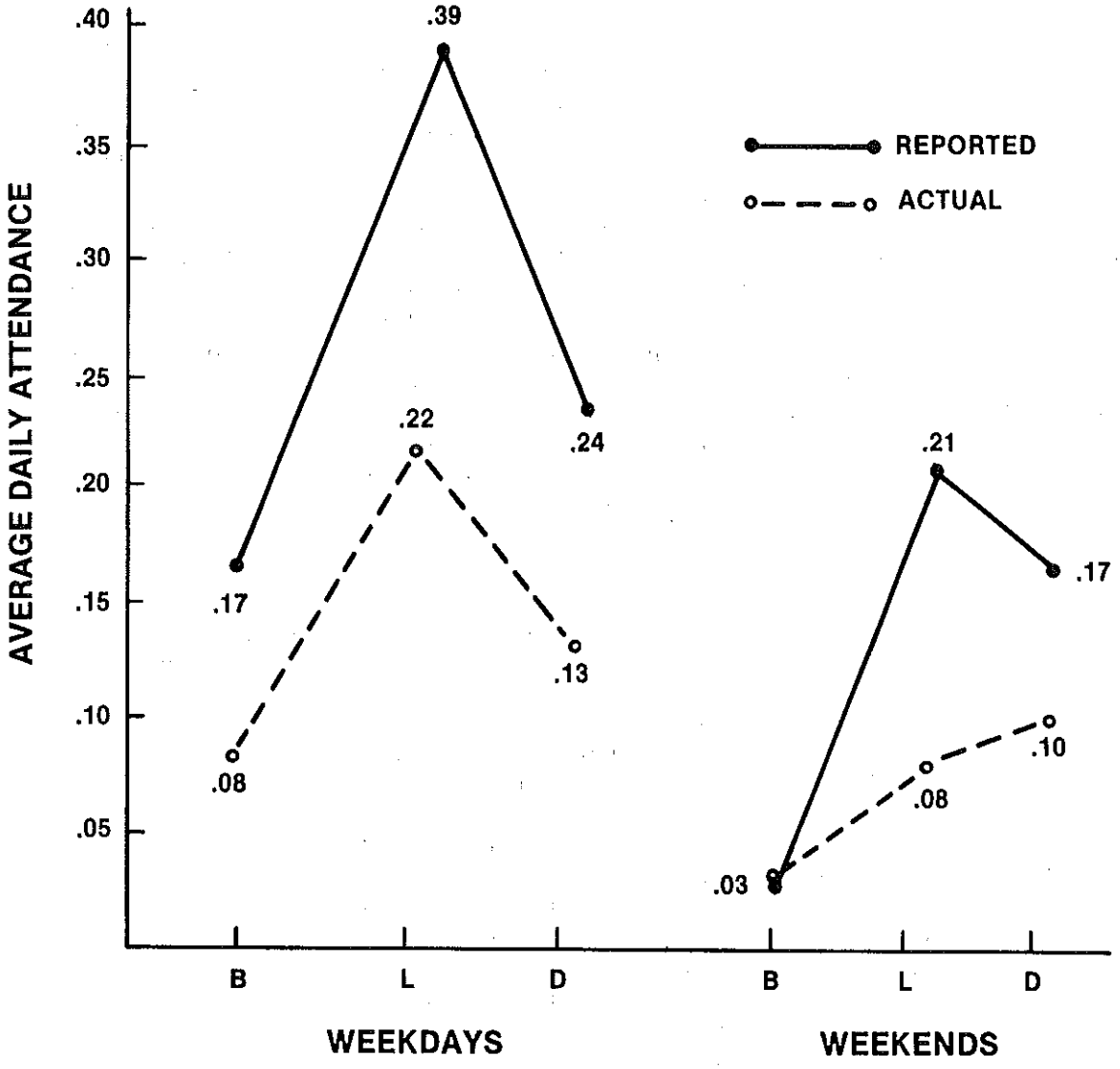
In follow-ups to the significant Source x Meal interaction, $F(2,2040)=6.51$, $p<.01$, reported rates significantly exceeded the actual rates for each meal (collapsed over the Day variable): breakfast, $F(1,682)=6.44$, $p<.05$; lunch, $F(1,682)=34.41$, $p<.01$; dinner, $F(1,682)=16.38$, $p<.01$. Similarly, in following up the significant Source x Day interaction, $F(1,2040)=5.19$, $p<.05$, reported significantly exceeded actual attendance rates for both types of days (collapsed over the Meal variable): weekdays, $F(1,1024)=17.86$, $p<.01$, and weekends, $F(1,1024)=37.45$, $p<.01$. These findings, of course, are in agreement with the earlier comments regarding the tendency of subjects to overestimate their frequency of attending meals in the dining hall.

The failure of the triple interaction in this analysis to achieve significance suggested that, even though the self-reports overestimated actual attendance, they may have accurately reflected fluctuations in actual attendance across meals on weekdays and weekends. If so, such reports could be used justifiably as indices of relative, rather than absolute, attendance, e.g., to determine whether attendance increased over a particular time period, rather than to determine the attendance at a particular meal. Returning to the Source x Day interaction, it was found in agreement with this proposition that both attendance sources yielded significant simple main effects for the latter variable, the weekday attendance rate significantly exceeding that on weekends in both cases: report, $F(1,340)=26.82$, $p<.01$; actual, $F(1,340)=19.56$, $p<.01$.

When the Source x Meal interaction was similarly reexamined, however, a discrepancy arose which negated the possibility of using the self-reports even as a measure of relative attendance. Although both attendance sources yielded a significant simple effect for meals (reported, $F(2,510)=35.00$, $p<.01$; actual, $F(2,510)=12.41$, $p<.01$), results of pairwise comparisons between meals (via the Scheffe technique) did not agree between the sources. For the reported data, attendance at lunch was significantly greater than attendance

FIGURE 1

REPORTED AND ACTUAL AVERAGE DAILY ATTENDANCE AT BREAKFAST (B), LUNCH (L), AND DINNER (D) ON WEEKDAYS AND WEEKENDS



at dinner ($p<.01$), which, in turn, was significantly greater than that at breakfast ($p<.01$); whereas, for actual data, attendance at lunch and dinner did not differ significantly ($p<.05$), although both significantly exceeded the attendance at breakfast ($p<.01$). Thus, reported attendance not only overestimated actual attendance, but also failed to match the actual data with regard to differences in attendance among meals.

Relationship of Errors in Reported Attendance to Other Variables

The pattern of reported and actual attendance depicted in Figure 1 suggested that the magnitude of the difference between the two measures varied as a function of the type of meal and day. To test this possibility, absolute differences between each respondent's reported and actual attendance for each of the six types of meals were computed and then converted to daily averages, as before, by dividing differences for weekday meals by five and differences for weekend meals by two. These average daily differences were subjected to an analysis of variance in which the Meal and Day variables constituted two factors. A third factor, ration status, was also included. Of the 171 participants, 76 received BAS (Basic Allowance for Subsistence; that is, a monetary allowance rather than free food in the dining hall), while the remaining 95 received RIK (Rations-In-Kind; that is, authorization to eat in the dining hall at no cost). These two groups differed with respect to a number of variables in addition to ration status. The BAS's tended to be older; in the service for a longer period of time; more likely to be married and living off-base; and less likely to eat meals in the dining hall, although less critical of the dining hall and food. Because of these differences and because of the traditional distinction made between the two groups in research of military dining systems (e.g., Siebold, Symington, Graeber, & Maas, 1975)[7], any differences in the accuracy of their reported attendance rates would be of interest.

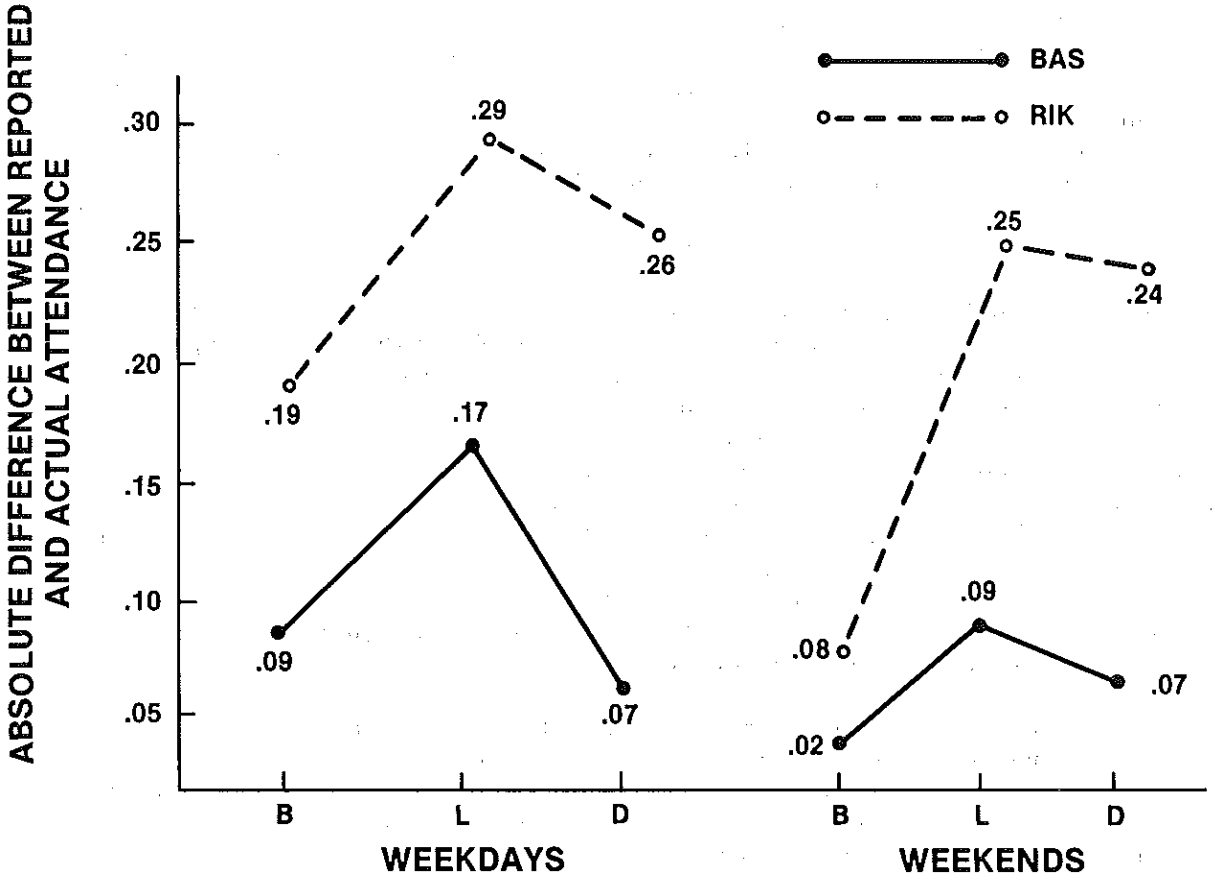
Each of the main effects in this analysis achieved statistical significance, as did the triple interaction, though none of the double interactions were significant. As shown in Figure 2, RIK's were less accurate than BAS's, $F(1,1014)=72.84$, $p<.01$; reports of weekday attendance were less accurate than reports of weekend attendance, $F(1,1014)=11.39$, $p<.01$; and reports of attendance at breakfast were less accurate than those at lunch or dinner, while the latter two did not differ significantly from one another, $F(2,1014)=15.43$, $p<.01$, with pairwise comparisons via the Scheffe technique. Each of these main effects is qualified by the significant triple interaction, $F(2,1014)=6.13$, $p<.01$, which was due to the relatively small difference score for the BAS's weekday dinner. This difference score produced a significant Meal x Day interaction for the BAS's (the corresponding interaction for the RIK's was not significant), $F(2,451)=9.48$, $p<.01$, and no significant difference between the weekday and weekend dinner scores for the BAS's while significant weekday-weekend differences for the BAS's were recorded for breakfast, $F(1,74)=11.64$, $p<.01$, and for lunch, $F(1,74)=15.21$, $p<.01$.

---

[7]Siebold, J.R., Symington, L.E., Graeber, R.C., Maas, D.L. Consumer opinion of cash food systems: Loring AFB (Part I - Short Term Findings). U.S Army Natick Research & Development Command Technical Report 76-35 FSL, 1976.

FIGURE 2

ABSOLUTE DIFFERENCES BETWEEN REPORTED AND ACTUAL AVERAGE DAILY ATTENDANCE AT BREAKFAST (B), LUNCH (L), AND DINNER (D) ON WEEKDAYS AND WEEKENDS AS REPORTED BY BAS AND RIK RESPONDENTS



The direction of the main effects in this last analysis paralleled those for actual attendance (RIK's attended more than BAS's, attendance on weekdays was greater than on weekends, and attendance was greatest at lunch and least at breakfast), indicating a positive relationship between the frequency of actual attendance and the inaccuracy of reported attendance - the more meals an individual ate in the dining hall, the less accurate his estimate of his attendance.

To test this notion, participants' actual attendance, summed over the six types of meals, was correlated with the absolute difference between their reported and actual attendance, again totaled over the six types of meals. A coefficient of $r=.41$ was obtained, indicating that subjects did tend to be more inaccurate the more frequently they actually attended. However, if, as suggested earlier, the difficulty involved in estimating attendance was substantially less for those who generally did not eat meals in the dining hall than for more regular attenders, this coefficient may have been spuriously increased by the 37% of the sample who attended no meals in the dining hall during the test period. When the same correlation was recomputed without these nonattenders, a coefficient of $r=.14$ was obtained. Thus, among those who ate in the dining hall, little relationship existed between the frequency of their attendance and the inaccuracy of their reports.

Discussion

The use of self-reported attendance rates as measures of actual attendance rests on certain assumptions concerning the distribution of report errors. When reports are used as estimates of absolute attendance, e.g., in determining how many persons attended a particular meal, the assumption is that errors are random and, with a large enough sample, therefore, will cancel one another. Accordingly, of the 125 participants who reported inaccurate rates, roughly half would have been expected to overestimate and half to have underestimated. The findings, of course, did not support this expectation, the obtained distribution (99 subjects overestimating and 26 underestimating) differing significantly from the even distribution predicted by chance, $x^2=22.04$, $p<.01$. Thus, the present findings provide no justification for the continued use of self-reports as measures of absolute attendance.

The possibility of employing reported attendance as a relative measure of actual attendance, e.g., in determining whether attendance at one meal was greater than at another meal, was likewise precluded by the present findings. This use of self-reports rests on the assumption that errors in estimates for different meals are distributed similarly, which was contradicted in the present study by the follow-ups to the significant Meal x Source interaction (Figure 1), in which the differences in attendance among meals yielded by self-reports disagreed with those yielded by the actual measures.

An aspect of the methodology which may have been responsible for the tendency of respondents to overestimate was the wording of the attendance question, viz., asking for attendance rates during a "typical" week.

According to this line of reasoning, more accurate reports may have been elicited had respondents been questioned about a specific time period. Data disputing this position, however, were collected from a separate military group at the Naval Air Station Alameda, CA. Specifically 117 personnel were asked in interviews to report, first, their attendance rate at meals in the dining facility during a typical week and, subsequently, their attendance rate during the two immediately preceding weeks. For comparison purposes, the former reports were doubled, yielding a mean two-week attendance rate of 8.93 meals, which did not differ significantly from the mean of 8.43 meals elicited by the latter question. This finding, that reported rates not dignificantly different from one another were produced by these two questions, suggests that the particular wording of the attendance question in the present study was not responsible for the inflated attendance rates reported.

A related argument, that sampling attendance for two weeks was too brief a period for comparisons with reported attendance for a "typical" week, must be similarly rejected. According to this argument, the proportion of respondents overestimating and underestimating their actual attendance would be expected to be equivalent, whereas in the present study the former proportion significantly exceeded the latter proportion.

The generality of the present findings with respect to the self-report method, in general, is uncertain. Some inferences may be made, however, on the basis of variables which are known or suspected to affect the accuracy of self-reports. A number of investigators have shown that self-report accuracy declines as the interval separating the report and the target behavior increases (Byham & Perloff, 1965[8]; Haley & Gatty, 1968[9]; Neter & Waksberg, 1965[10]; Parfitt, 1967)[11]. Pohlman (1973)[12], and others, have found that self-reports are influenced by the perceived social desirability of the behavior in question. Additionally, demand characteristics of the interview situation are known to affect report accuracy. A fourth factor which is likely capable of influencing the accuracy of self-reports, but with respect to which no data has been systematically collected, is the clarity with which the target behavior can be defined. It is likely, for example, that a behavior such as the purchasing of a product as investigated by Byham and Parloff would be reported more accurately, if all other factors were held constant, than the behaviors comprising the "academic growth" studied by Pohlman, due to the difference between the two in the ease with which each may be specified.

---

[8] See Footnote 6

[9] Haley, R.I., & Gatty, R. Monitor your market continuously. Harvard Business Review, 1968, May-June, 65-69.

[10] Neter, J., & Waksberg, J. Response errors in collection of expenditure data by household interviews: An experimental study. U.S. Department of Commerce, Bureau of the Census, Technical Paper No. 11, 1965.

[11] Parfitt, J.H. A comparison of purchase recall with diary panel records. Journal of Advertising Research, 1967, September, 31.

[12] See Footnote 5

Although none of these variables were measured in this study, their affects were probably minimal, since the present target behavior was recent in time, relatively neutral in social desirability, and clearly definable. The relative lack of situational demands on the respondents is suggested by the freedom with which the majority of the respondents criticized the food system in response to subsequent questions in the interview (see Siebold & Meiselman, 1975)[13]. In many ways, therefore, the self-report of current attendance at meals in a dining facility constituted an optimal behavior with which to assess the general ability of persons to report accurately the frequency of previously performed behaviors. In these terms, then, the present findings may be viewed as seriously compromising the validity of the self-report method, in general, and certainly calling for continued empirical verification of self-report procedures before the results are used with confidence as measures of actual behavior.

[13]Siebold, J.R., & Meiselman, H.R. Consumer opinion of cash food systems: Shaw Air Force Base. U.S. Army Natick Research and Development Command Technical Report, TR 75-77 FSL, 1974.

References

Branch, L.G., Symington, L.E., & Meiselman, H.L. The consumer's opinions of the food service system: The 1973 Minot Air Force Base survey. U.S. Army Natick Laboratories Technical Report, TR 74-7-PR, 1973.

Byham, J., & Perloff, R. Recall of product purchase and use after six years. Journal of Advertising Research, 1965, September, 16.

Haley, R.I., & Gatty, R. Monitor your market continously. Harvard Business Review, 1968, May-June, 65-69.

Meiselman, H.L., Van Horne, W., Hasenzahl, B., & Wehrly, T. The 1971 Fort Lewis food preference survey. U.S. Army Natick Laboratories Technical Report, TR 72-43-PR, 1972.

Neter, J., & Waksberg, J. Response errors in collection of expenditure data by household interviews: An experimental study. U.S. Department of Commerce, Bureau of the Census, Technical Paper No. 11, 1965.

Parfitt, J.H. A comparison of purchase recall with diary panel records. Journal of Advertising Research, 1967, September, 31.

Pohlman, J.T. A study of the validity of self-reported measures of academic growth. Dissertation Abstracts International, 1973, 33(9-A), 4951-4952.

Siebold, J.R., & Meiselman, H.L. Consumer opinion of cash food systems: Shaw Air Force Base. U.S. Army Natick Research and Development Command Technical Report, TR 75-55 FSL, 1974.

Siebold, J.R., Symington, L.E., Graeber, R.C., & Maas, D.L. Consumer opinion of Cash Food Systems: Loring AFB (Part I - Short Term Findings). U.S. Army Natick Research and Development Command Technical Report, TR 76-35 FSL, 1976.

Walsh, W.B., & Maxey, E.J. Validity of self-report and personality. Journal of Counseling Psychology, 1972, 19, 563-564.

Williams, W.E., & Sieler, D.A. Relationship between measures of effort and job performance. Journal of Applied Psychology, 1973, 57, 49-54.

Appendix

Patterns of Attendance by Individuals Over Time

Appendix

Patterns of Attendance by Individuals Over Time

The original purpose of the self-report method of collecting attendance data was to provide an efficient and economical procedure for obtaining information about individuals' eating habits. It made possible, for example, determining the probability a person would eat lunch in the dining hall on Tuesday if he had had breakfast there that day. In this manner, data pertaining to individuals' patterns of attendance over time could be obtained. By identifying prevalent patterns for particular groups of airmen (e.g., married airmen living on base), the food service office would be able to plan meals to suit the preferences of the type(s) of patrons most likely to attend, as well as to develop a better understanding of the habits of the consumer population in general.

The finding that self-reported attendance rates were invalid with respect to actual attendance, of course, precluded their continued use as a means for collecting attendance information. Alternative procedures (e.g., examining sign-in sheets, counting the number of meals served, tallying cash register receipts), however, are typically limited to providing group data, albeit valid, such as the number of consumers attending a particular meal or indications of whether attendance at one meal differed from that at another meal.

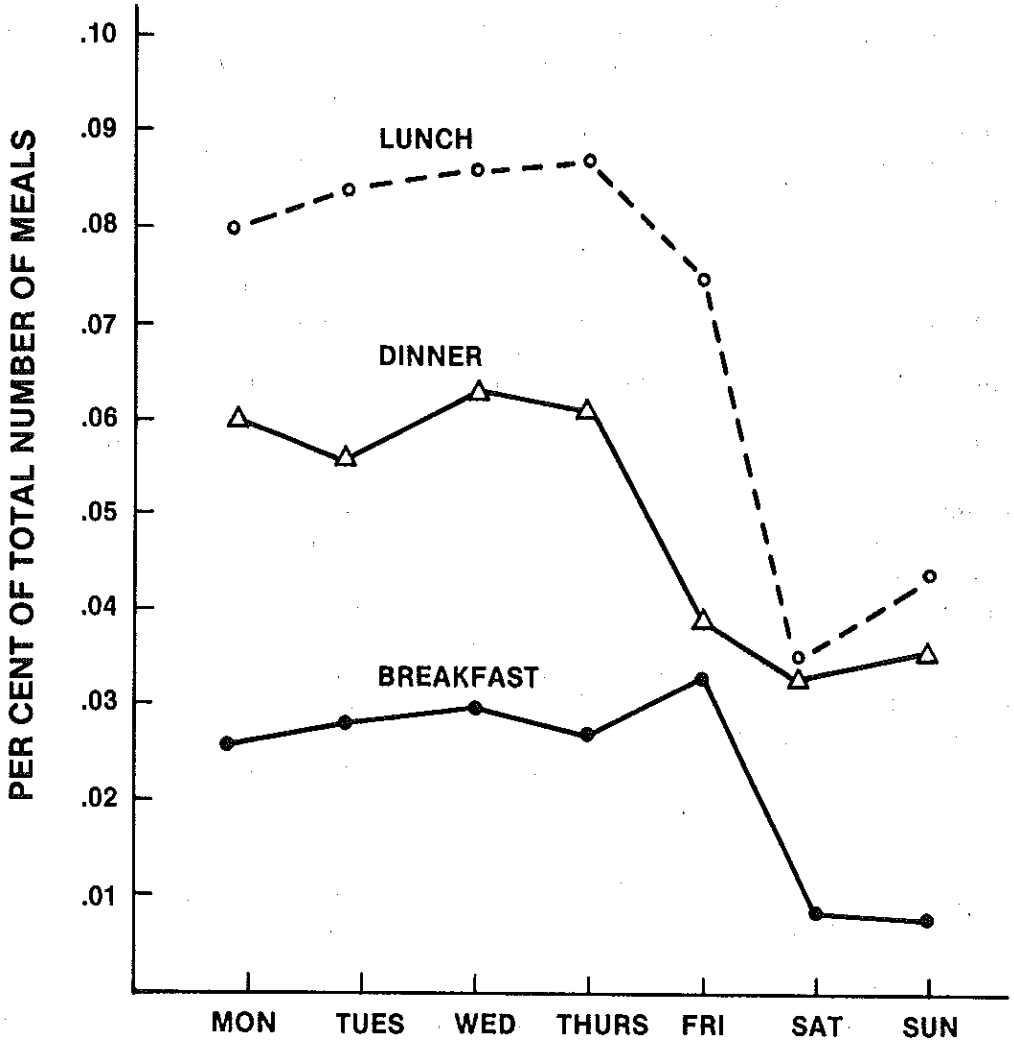
In contrast, the method used in the current study for obtaining actual attendance data to compare with self-reports did allow for tracking particular individuals over the two-week period. As described in the Method section, it involved distributing to the base population identification cards by means of which patrons at various meals were identified. (It should be noted that, despite the valuable information provided by this method, the cost and labor required preclude its wide-spread use.) Presented in this appendix are the results of preliminary efforts to use these data in identifying patterns of attendance displayed by individuals over the two weeks in question.

During this period, 3,103 airmen (those receiving cards) consumed 11,009 meals. The particular times at which these meals were eaten is depicted in Figure 3, which presents the percent of the total number of meals for Week 1 and Week 2 combined eaten at breakfast, lunch, and dinner on each day of the week. (These data are good examples of the group measures referred to above.) Attendance from Monday through Thursday was relatively constant, dropping off slightly on Friday, and then decreasing considerably on Saturday and Sunday. Lunch was clearly the most attended meal. Of all the meals, 41% were eaten at lunch on Monday through Thursday.

Attendance by individuals during the two weeks was highly variable, although generally infrequent (Table 1). A full third of the population receiving cards did not eat in the dining hall at all, and another third ate there fewer than five times. If one arbitrarily selects 12 meals as the minimum in terms of the total number of meals individuals eat during a week, less than 1% of the sample ate all of their meals in the dining hall.

FIGURE 3

PER CENT OF TOTAL NUMBER OF WEEK 1 AND 2 MEALS EATEN AT BREAKFAST, LUNCH, AND DINNER ON EACH DAY OF THE WEEK



It was possible, despite the low frequency of attendance for most airmen, to study patterns of attendance by, first, devising a scheme with which to describe patterns; second, categorizing consumers in accordance with the patterns they displayed during the two-week period; and, finally, dividing the consumer population into various demographic groups prior to categorizing them by their attendance patterns.

The scheme devised for describing patterns was based on the type of meal(s) attended, rather than on the frequency of attendance. It can best be explained by referring to Table 2. For the present purposes six types of meals were considered -- weekday breakfast, lunch, dinner, and weekend breakfast, lunch, and dinner. If the only type of meal an individual ate in the dining hall was breakfast on weekdays, he would be added to pattern category 1, regardless of whether it was only one weekday on which he ate breakfast in the dining hall or on all five weekdays. The critical factor is that he attended only one particular type of meal, breakfast on weekdays. This pattern, as shown in Table 2, characterized 5% of the sample during Week 1 and 7% of the sample during Week 2.

Six patterns (1-6) involved only one type of meal. Fourteen other patterns (7-21) involved two types of meals. Pattern category 18, for example, contained all individuals who, during either Week 1 or Week 2, ate at least one lunch in the dining hall on a weekday and at least one dinner on weekends. It must be reemphasized that membership in this, or in any other category was not related directly to attendance frequency. Thus, an individual who ate five weekday lunches and two weekend dinners in the dining hall during one of the weeks would be placed in pattern category 18, just as would an individual who ate there for only one weekday lunch and one weekend dinner. The fact that both persons ate in the dining hall at only two particular types of meals sufficed for them to be categorized together.

Although not based on attendance frequency, this scheme was hardly independent of it. If an individual ate in the dining hall only once during the week, he obviously would not be eligible for membership in any category other than 1-6. Since a large proportion of the sample did in fact eat only one meal in the dining hall (Table 1) and since attendance rates on weekdays far surpassed those on weekends (Figure 3), it is not surprising that nearly half of the sample were in pattern categories involving one type of weekday meal (patterns 1-3).

Similarly, patterns involving weekday or weekend breakfasts, because of the relatively low attendance rates at these meals, typically contained fewer individuals than patterns in which these meals were not included. (Compare, for example, pattern 8 and 12 or pattern 26 and 33.)

Besides patterns 2 and 3, the only pattern containing anywhere near 10% of the sample was pattern 12, weekday lunch(es) and dinner(s). Of the 63 possible patterns, 15 accounted for 85% of the Week 1 attenders and 92% of

Table 1

Attendance Frequency By Indivuals in the Dining Hall
During a Two-Week Period

Number of Meals	Frequency	Percentage
0	1045	34
1	601	19
2	289	9
3	190	6
4	153	5
5	117	4
6	93	3
7	89	3
8	92	3
9	67	2
10	66	2
11	51	2
12	27	1
13	32	1
14	27	1
15	26	1
16	22	1
17	22	1
18	14	*
19	13	*
20	12	*
21	13	*
22	13	*
23	8	*
24	5	*
25	4	*
26	2	*
27	2	*
28	2	*
29	1	*
30	2	*
31	0	0
32	1	*
33	2	*
34	0	0
35	1	*

$0 < * < 1\%$

Table 2

Attendance Patterns and the Percentage of Attenders During Week 1 and Week 2 Contained in Each

Pattern Category	Weekdays B	L	D	Weekends B	L	D	Percentage Week 1	Percentage Week 2
1*	x						5.2	7.1
2*		x					29.9	29.7
3*			x				11.9	11.2
4				x			.6	.6
5*					x		3.1	3.1
6*						x	1.8	1.9
7*	x	x					3.2	4.1
8*	x		x				1.7	1.9
9	x			x			.3	.2
10	x				x		.7	.4
11	x					x	.1	.2
12*		x	x				9.2	9.1
13		x		x			.5	.2
14*		x			x		3.1	2.3
15		x				x	.9	1.4
16			x	x			.2	.2
17			x		x		.9	1.1
18*			x			x	1.9	2.0
19				x	x		.1	.1
20				x		x	.1	0
21					x	x	.3	.1
22*	x	x	x				3.7	3.9
23	x	x		x			.1	0
24	x	x			x		.7	.4
25	x	x				x	.4	.6
26	x		x	x			.3	.1
27	x		x		x		.3	.7
28	x		x			x	.2	.6
29	x			x	x		.1	0
30	x			x		x	.1	0
31	x				x	x	0	.2
32		x	x	x			.3	.2
33*		x	x		x		2.8	2.0
34*		x	x			x	2.5	2.5
35		x		x	x		.1	.1
36		x		x		x	0	0
37		x			x	x	.9	.6
38			x	x	x		.1	0
39			x	x		x	.1	0
40			x		x	x	.9	.9
41				x	x	x	.1	.1
42			x	x	x	x	.1	0
43		x		x	x	x	.1	.1
44*		x	x		x	x	3.1	2.0
45		x	x	x		x	.1	.1
46		x	x	x	x		.2	.1
47	x			x	x	x	0	0
48	x		x		x	x	.6	.7
49	x		x	x		x	.3	.1
50	x		x	x	x		.1	.1
51	x	x			x	x	.1	.2
52	x	x		x		x	0	.1
53	x	x		x	x		.1	.1
54	x	x	x			x	1.0	1.2
55	x	x	x		x		1.1	1.5
56	x	x	x	x			.4	.6
57		x	x	x	x	x	.3	.1
58	x		x	x	x	x	.2	.2
59	x	x		x	x	x	0	.1
60*	x	x	x		x	x	1.9	1.7
61	x	x	x	x		x	.3	.4
62	x	x	x	x	x		.3	.4
63	x	x	x	x	x	x	.8	.4

the Week 2 attenders. (These are indicated in Table 2 by asterisks.) In accordance with the group attendance frequency data (Figure 3), 10 of these patterns involved weekday lunches, whereas none involved weekend breakfasts.

As a final step in this analysis, the sample of attenders was divided into four groups: married airmen living on base (15% of the sample), unmarried airmen living on base (46%), married airmen living off base (31%), and unmarried airmen living off base (8%). Table 3 presents the breakdown of these groups according to the patterns of attendance they displayed during Week 2.

The greatest difference in patterns was between the married group living off base and the unmarried on-base group. Two factors were primarily responsible for this difference: (a) the relatively large percentage of the former group who ate only one type of meal in the dining hall (78%, as compared to 35% of the latter group), and (b) the tendency of the married off-base group to eat weekday and weekend dinner meals outside of the dining hall (only 18% of this group had patterns involving a dinner meal, in comparison to 69% of the unmarried persons living on base).

With few exceptions, the patterns characterizing the on-base married's and the off-base unmarried's were similar. One notable exception was in pattern category 12. The latter group was considerably more likely than the former group to have eaten both lunch and dinner in the dining hall on weekdays.

In summary, the individual meal pattern data indicated that: (a) the majority of consumers (approximately 53%) attended only one type of meal in the dining hall during the two weeks in question, although a substantial percentage (approximately 9%) ate there for at least one weekday lunch and one weekday dinner; (b) a relatively small subset of patterns (15 of 63) accounted for approximately 85% of the customers; and (c) the meal patterns exhibited by four demographic groups varied, those of unmarried personnel living on base differing considerably from those of married personnel living off base, whereas those of the on-base married personnel closely approximating those of the off-base unmarried personnel.

Table 3

Week 2 Attendance Patterns and the Percentage of Four Groups of Airmen Contained in Each

Pattern Category	Weekdays B	L	D	Weekends B	L	D	Percentage of On-Base Married's	Percentage of On-Base Unmarried's	Percentage of Off-Base Married's	Percentage of Off-Base Unmarried's
1	x						10.7	4.4	7.3	10.7
2		x					28.2	16.1	52.3	27.2
3			x				10.2	10.9	10.4	8.7
4				x			.5	.7	1.0	0
5					x		3.9	1.8	4.4	2.9
6						x	1.5	1.3	2.7	1.9
7	x	x					5.3	3.9	4.1	6.8
8	x		x				3.4	2.4	0	1.9
9	x			x			.5	.3	.2	0
10	x				x		0	.7	.5	0
11	x					x	0	.5	0	0
12		x	x				5.3	11.4	6.1	12.6
13		x		x			.5	0	0	1.0
14		x			x		2.4	2.0	3.6	2.9
15		x				x	1.5	1.0	1.7	1.9
16			x	x			.5	.3	0	0
17			x		x		1.0	1.8	1.2	0
18			x			x	3.9	2.6	.2	1.9
19				x	x		0	.2	.2	0
20				x		x	0	0	0	0
21					x	x	0	.2	0	0
22	x	x	x				7.8	5.4	.2	6.8
23	x	x		x			0	0	0	0
24	x	x			x		0	1.0	0	1.0
25	x	x				x	0	.5	.7	0
26	x		x	x			0	.2	.2	0
27	x		x		x		0	.1	0	2.9
28	x		x			x	.5	1.0	0	1.0
29	x			x	x		0	0	0	0
30	x			x		x	0	0	0	0
31	x				x	x	0	.5	0	0
32		x	x	x			0	.5	0	0
33		x	x		x		1.5	3.6	1.0	1.0
34		x	x			x	1.0	4.6	.2	1.9
35		x		x	x		0	0	0	0
36		x		x		x	0	0	0	0
37		x			x	x	1.5	.7	.2	1.0
38			x	x	x		0	0	0	0
39			x	x		x	0	0	0	0
40			x		x	x	1.0	1.5	0	0
41				x	x	x	0	.3	0	0

Table 3 (Cont'd)

Pattern Category	Weekdays B	Weekdays L	Weekdays D	Weekends B	Weekends L	Weekends D	Percentage of On-Base Married's	Percentage of On-Base Unmarried's	Percentage of Off-Base Married's	Percentage of Off-Base Unmarried's
42			x	x	x	x	0	0	0	0
43		x		x	x	x	0	.2	0	0
44		x	x		x	x	2.4	3.4	.2	1.0
45		x	x	x		x	0	.2	0	0
46		x	x	x	x		0	.3	0	0
47	x			x	x	x	0	0	0	0
48	x		x		x	x	.5	1.0	0	0
49	x		x	x		x	.5	0	0	0
50	x		x	x	x		0	.2	0	0
51	x	x			x	x	0	.5	0	0
52	x	x		x		x	0	.2	.2	0
53	x	x		x	x		0	0	.2	1.0
54	x	x	x			x	1.0	2.0	0	1.0
55	x	x	x		x		1.5	2.4	.2	0
56	x	x	x	x			0	1.5	0	0
57		x	x	x	x	x	.5	.2	0	0
58	x		x	x	x	x	0	.2	0	0
59	x	x		x	x	x	0	.2	0	0
60	x	x	x		x	x	1.0	2.9	0	0
61	x	x	x	x		x	0	.5	.2	0
62	x	x	x	x	x		0	.8	0	0
63	x	x	x	x	x	x	.5	.7	0	0